Characteristics	Optimal insertion (n=62)	Sub-optimal insertion (n=20)
	n (%)	n (%)
Brachytherapy fractions	197 [85.3%]	34 [14.7%]
Age (years)		
Range	22 - 76	38 - 79
Median	52	55.5
Stage		
IB	2 [3.2%]	1 [5%]
IIA	3 [4.8%]	0 [0%]
IIB	48 [77.4%]	10 [50%]
IIIA	2 [3.2%]	0 [0%]
IIIB	4 [6.5%]	9 [45%]
IVA	1 [1.7%]	0 [0%]
Unknown	2 [3.2%]	0 [0%]
Initial tumor size (cc)		
Range	1.1 - 510.1	4.4 - 189.8
Mean ± SD[1]	74.7 ± 97.1	63.4 ± 58.3
Unknown	19 [30.6%]	6 [30%]
Residual tumor size (cc)		
Range	0.5 - 90.8	0.5 - 20.7
Mean ± SD	14.4 ± 25.8	7.1 ± 8.7
CR[2]	16 [25.8%]	4 [20%]
Unknown	30 [48.4%]	8 [40%]
Site of sub-optimal insertion		
Fundus uteri		5 [25%]
Posterior uterine wall		12 [60%]
Anterior uterine wall		3 [15%]

[1]SD – standard deviation
[2]CR – complete response

Conclusions: CT imaging allows detection of uterine perforation, as well as sub-serosal insertion of uterine tandem in CT-guided intracavitary HDR brachytherapy for cervix carcinoma. We report a relatively low incidence of these events, even without image guidance during applicators insertion.

EP-1598

An intracavitary/interstitial technique with rotated ovoid-guided needles insertion for asymmetric cervix tumor

N. Amornwichet[1], A. Songtong[1], M. Kaewsumur[1], C. Khorprasert[1]
[1]*Chulalongkorn University, Radiation Oncology, Bangkok, Thailand*

Purpose/Objective: In brachytherapy, cervical tumors with large width and laterally asymmetrical geometry are difficult to treat with intracavitary applicators only. Combined intracavitary/interstitial applicators can optimize the possible dose distributions. This work proposes the use of a commercial available applicator in a modified way for better tumor coverage.

Materials and Methods: A 70-year-old patient with stage IIB cervical cancer was treated with 50.4 Gy in 28 fractions external beam whole pelvic radiotherapy, additional brachytherapy with a planning aim of HR CTV D90 > 90 Gy EQD2 and HR CTV D98 > 80 Gy EQD2 in 4 fractions. An ovoid with holes drilled for guiding needle insertion was used (Utrecht applicator, Elekta Brachytherapy). The first insertion was done by conventional ovoids/needles position. In the second insertion, one ovoid was rotated, not fixed to the tandem and fixation mechanics, the needles were inserted more laterally to improve tumor coverage.

Results: In MRI, the HR CTV maximum width was 4.1 cm, 3.5 cm right-sided and 0.6 cm left-sided from the tandem. HR CTV volume was 49 cm^3. With the rotating ovoid technique, the position of needles at level of tumor maximum width was 0.5 cm shifted to right lateral side. And these resulted an improvement of D90 dose from 7.1 to 7.7 Gy and D98 dose from 5.8 to 6.3 Gy while decreasing doses to bladder and sigmoid.

Conclusions: The novel technique of rotating ovoid-guided needles insertion was feasible and resulted improvement of dose coverage to tumor with remarkably laterally asymmetric geometry, and additionally diminish doses to surrounding normal organs.

EP-1599

Uterine perforation during three-dimensional image guided brachytherapy in cervical cancer ñ 3-year experience

C. Ferreira[1], A. Alzamora[1], A. Pinho[2], S. Pinto[2], T. Viterbo[2], A. Pereira[2], L. Carvalho[1], L. Salgado[1]
[1]*Instituto Português de Oncologia do Porto, Radiotherapy, Porto, Portugal*
[2]*Instituto Português de Oncologia do Porto, Medical Physics, Porto, Portugal*

Purpose/Objective: Cervical cancer is third most common female cancer and the fourth most common cause of cancer death. Combination of external beam radiation therapy (EBRT) with concomitant chemotherapy (CT) and brachytherapy (BT) is an essential treatment modality for this pathology. In intracavitary (IC) BT, an applicator is placed in uterine cavity and vaginal fornices. The accurate positioning of the IC applicator is of extreme importance for delivering the appropriate dose to the target volume, while keeping the surrounding tissues and organs with doses below their tolerance limits. Uterine perforation can lead to under dosage of the target volume and excessive dosage in the organs at risk, compromising local control of the disease and increasing the risk of acute and long-term complications.
The aim of this work is to determine the incidence and characteristics of uterine perforation since the introduction of the 3D image-guided BT and its impact on the treatment of patients with cervical cancer.

Materials and Methods: It was performed a retrospective analysis of clinical and radiological process of patients with cervical cancer treated with utero-vaginal image guided BT, between October/2011 and October/2104.

Results: Between October/2011 and October/2014, 163 patients underwent utero-vaginal BT with curative intent, 314 applications were made. In all patients the treatment plan included EBRT (40 to 50 Gy) with concomitant CT. Uterine perforation occurred in 23 patients (14.1%) and in 27 applications (8.6%). The most common site of perforation was the uterine fundus, followed by the anterior and posterior wall. All patients were treated conservatively without complications. The treatment was feasible in 13 patients who had uterine perforation. In patients who suffered uterine perforation, the average diagnosis age was 55 years old (30 to 74 years old) and the average size of the cervix at diagnosis was 5 cm (3 to 7 cm). Six of these patients were submitted to previous cone biopsy and only 5 patients had retroflexed uterus.